

The Erosion of Coal's Market Share in the Power Generation Industry

Association for University Business &
Economic Research Conference

October 22, 2017

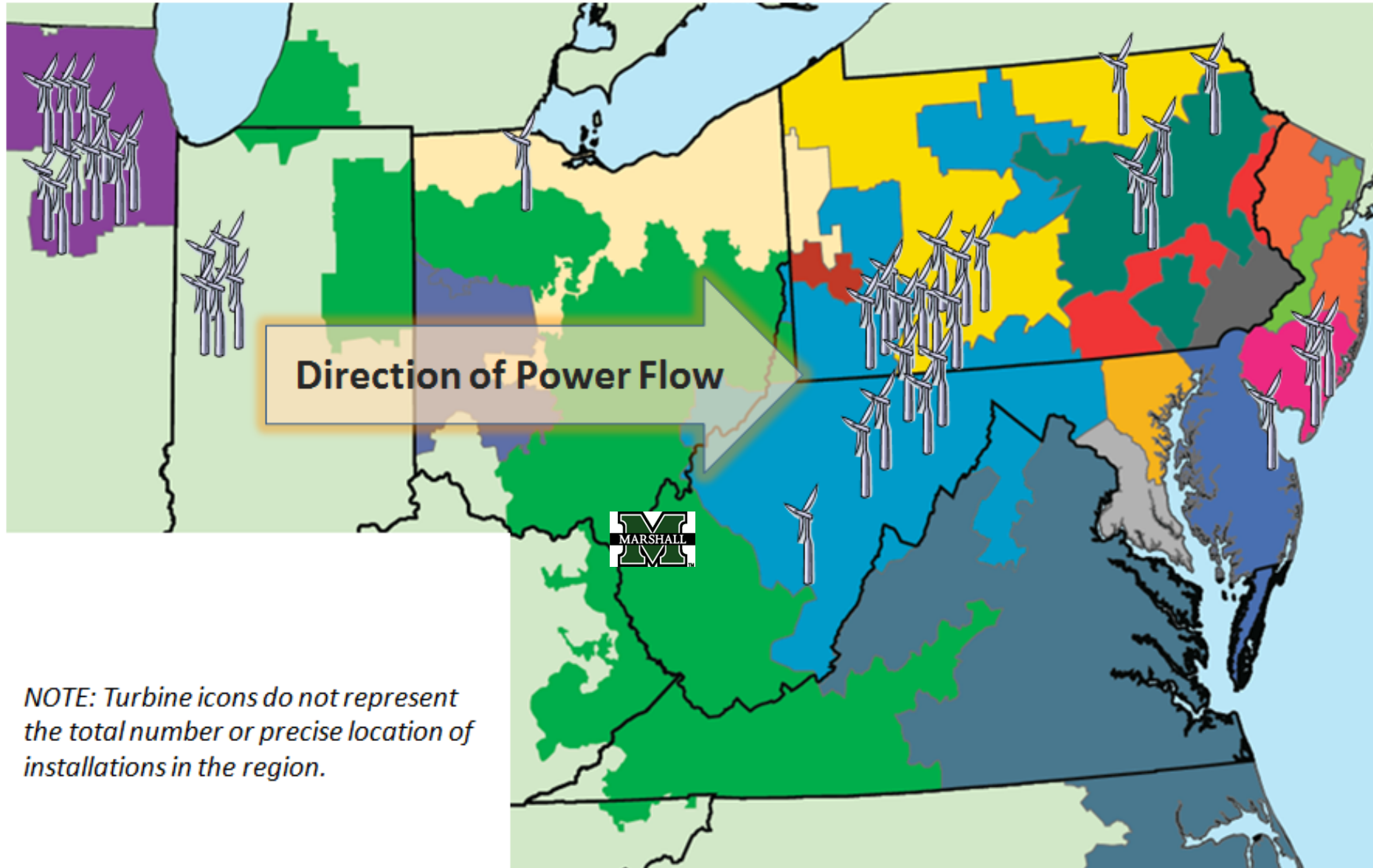
Christine Risch, Director of Resource & Energy Economics



Intro – What Has Happened?

- Coal-fired electricity market share fell from 51% in 2008 to 31% in 2016
- The primary cause is low natural gas prices
- Secondary causes are regulation and renewables
- Cheaper cost of capital for gas plants is also a cause
- Is this negatively impacting electricity prices? – No.
- Or reliability? – No.
- Should coal-fired (and nuclear) generation be saved?

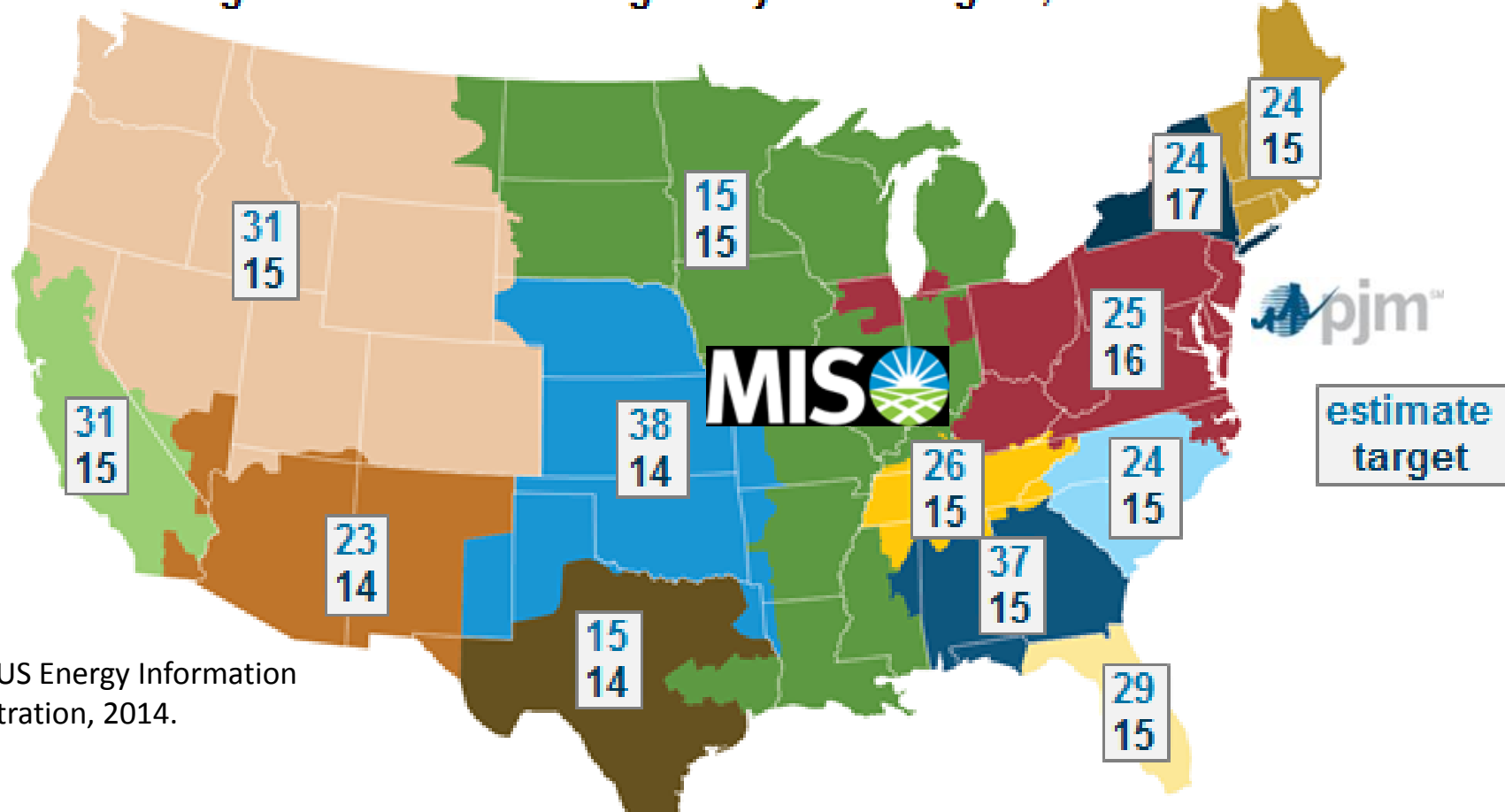
PJM Territory



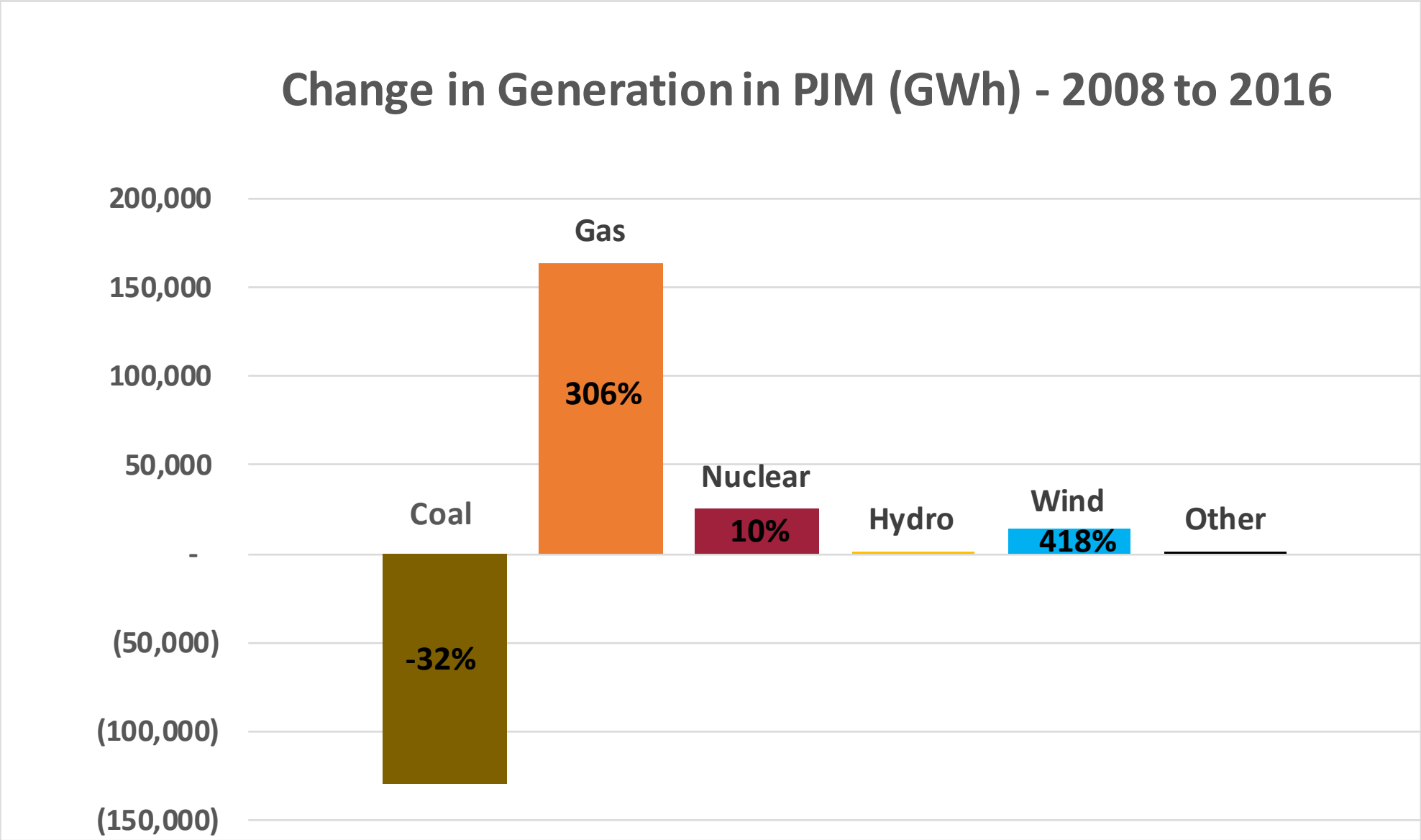
NOTE: Turbine icons do not represent the total number or precise location of installations in the region.

A National View

Reserve margin estimates and targets by NERC region, summer 2014

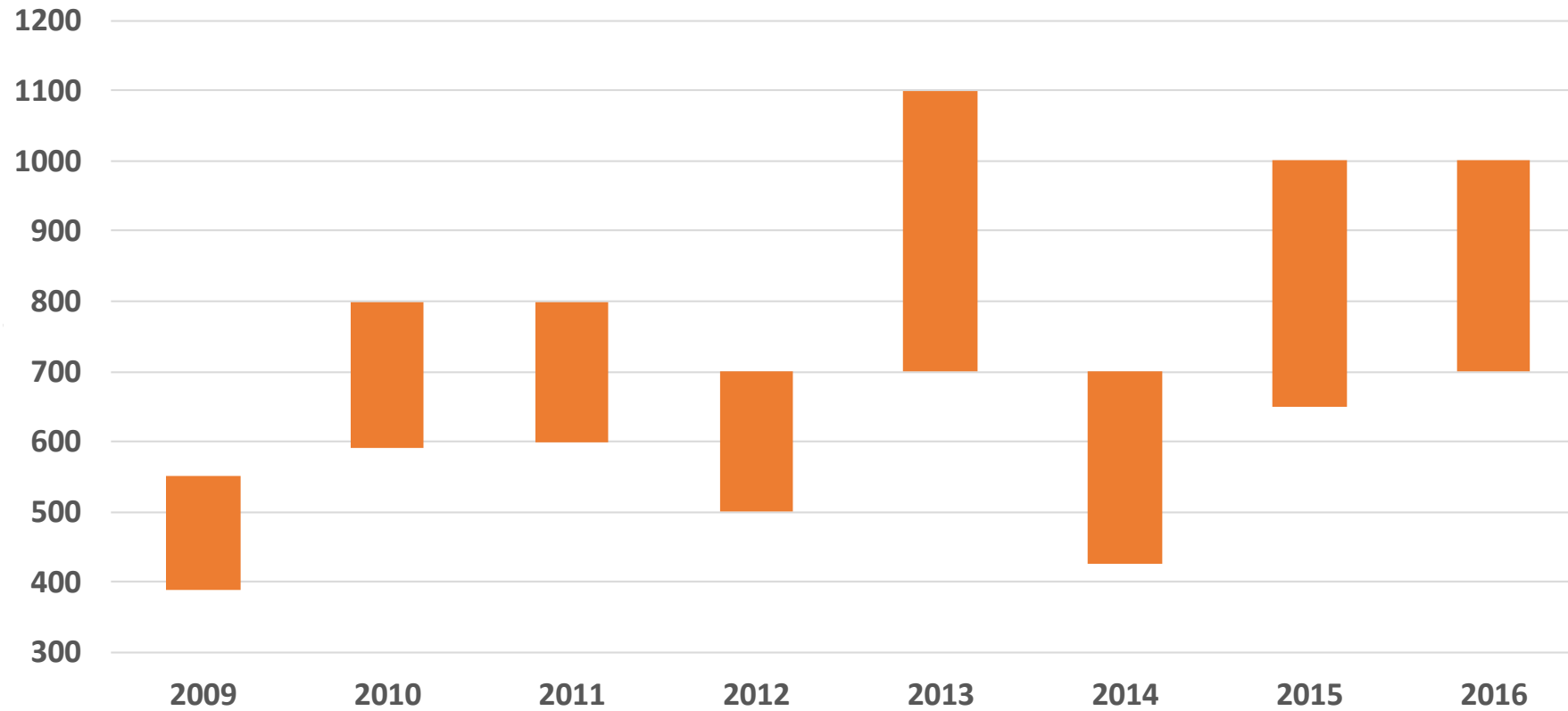


Fuel Mix Change in PJM (Mid-Atlantic)



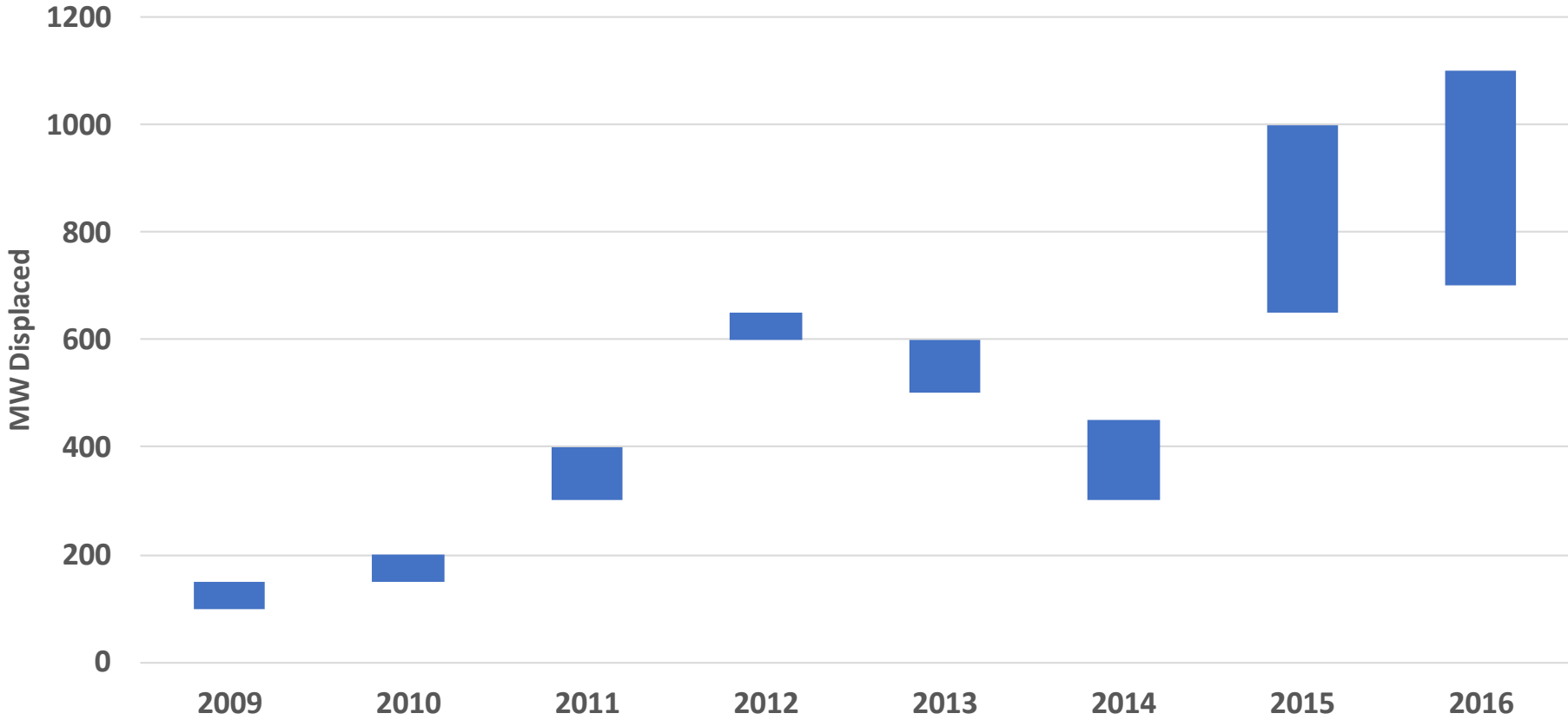
Data Source: Monitoring Analytics, PJM State of the Market Reports.

Coal Capacity on the Margin in PJM: MW Displaced by Wind



Data Source: Monitoring Analytics.

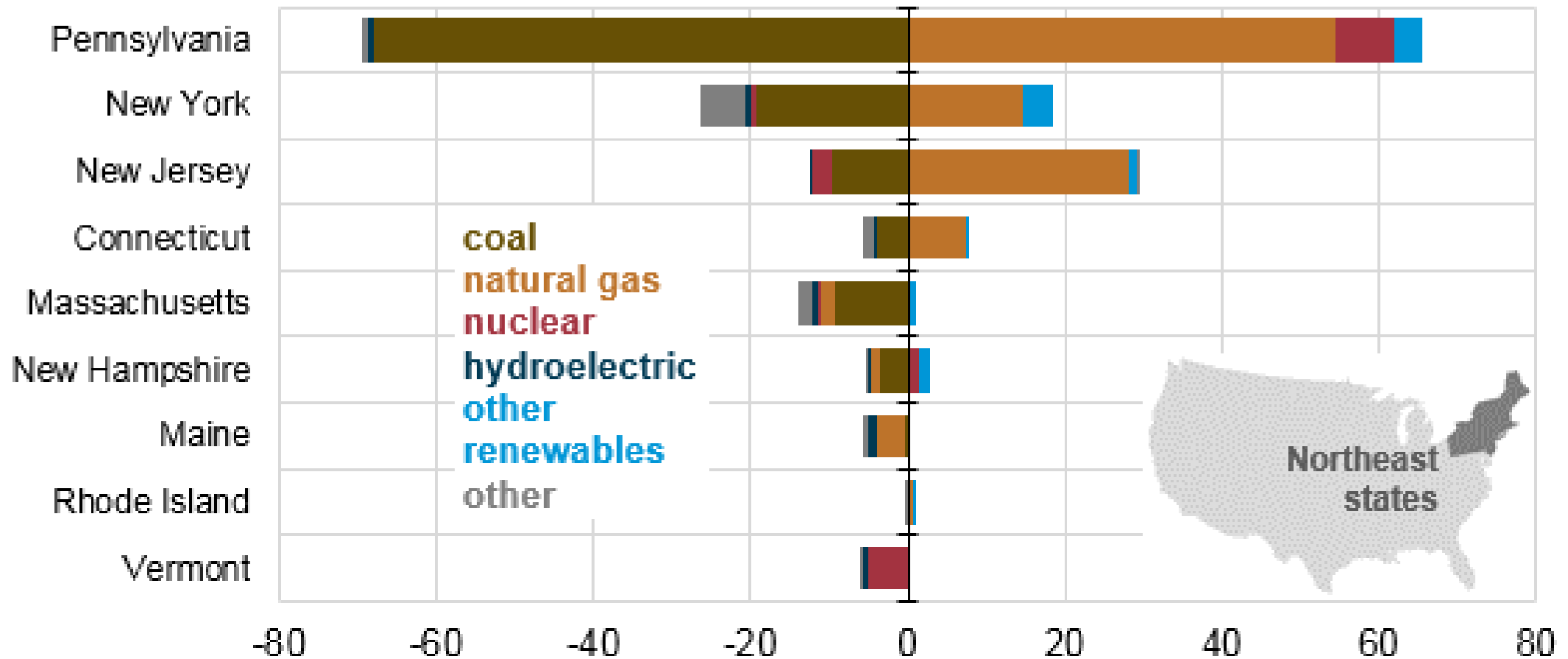
Gas Capacity on the Margin in PJM: MW Displaced by Wind



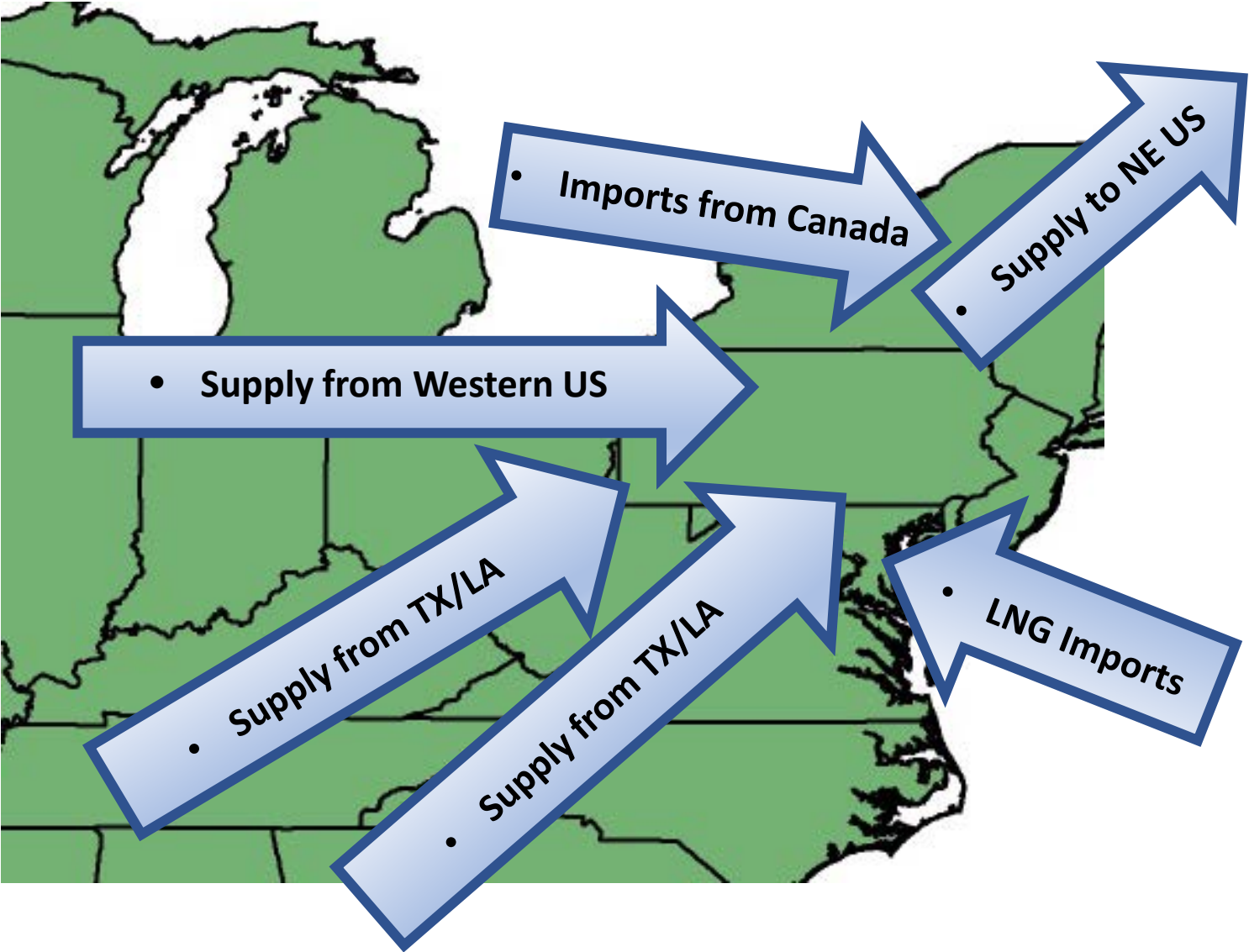
Data Source: Monitoring Analytics.

Fuel Mix Change in Northeast

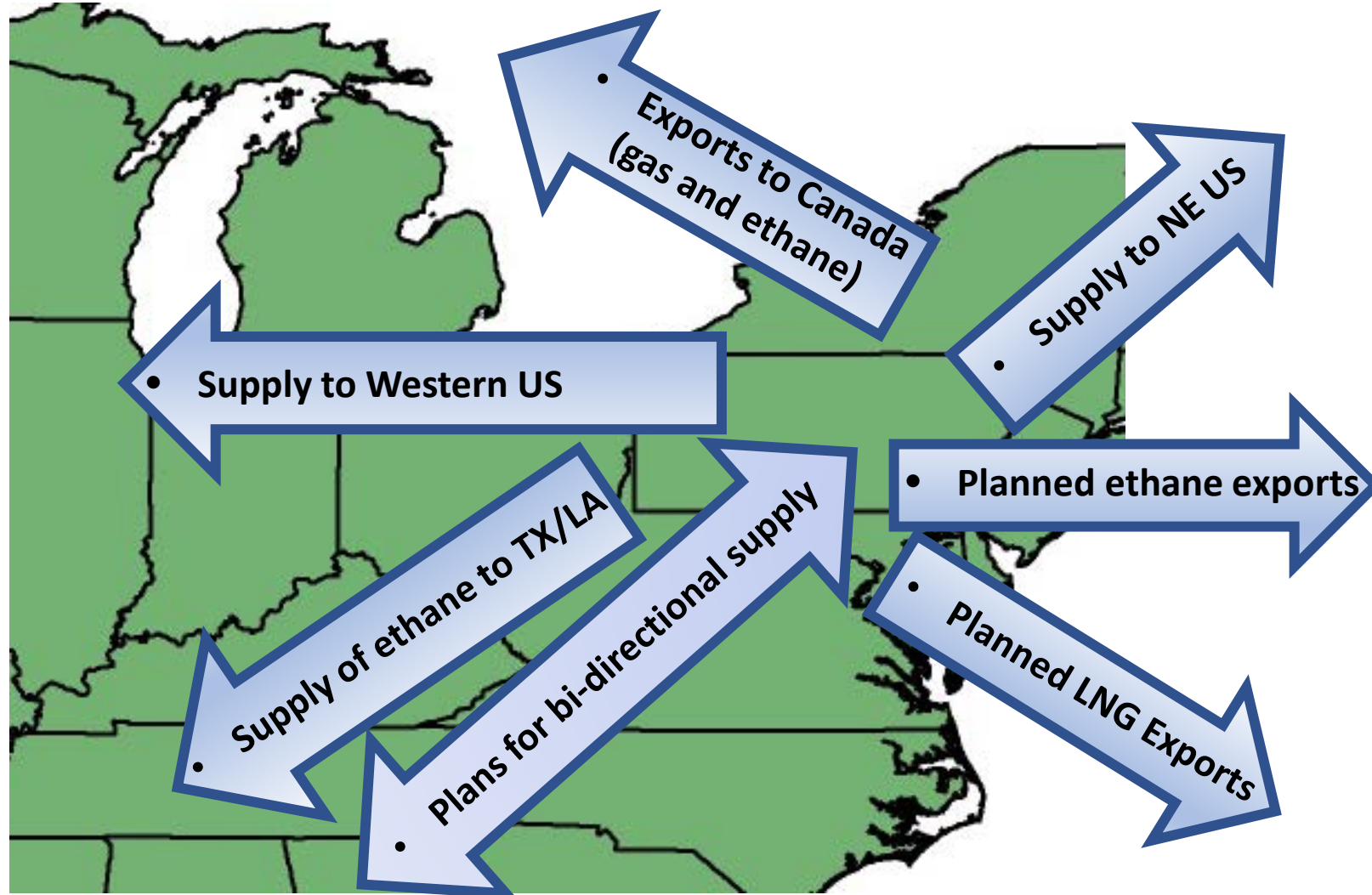
Change in electricity generation by fuel in Northeast states, 2006-2016
million kilowatthours



Before Marcellus....

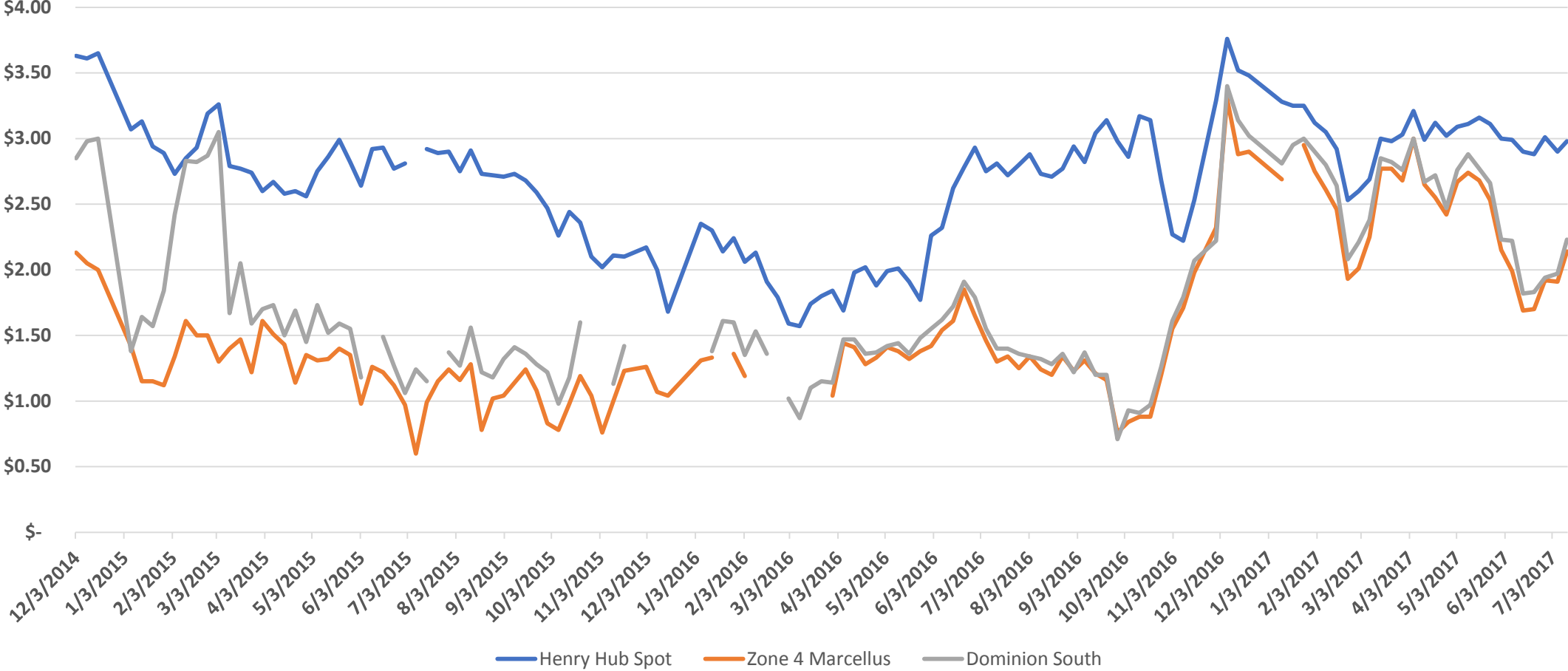


What is happening or about to happen....



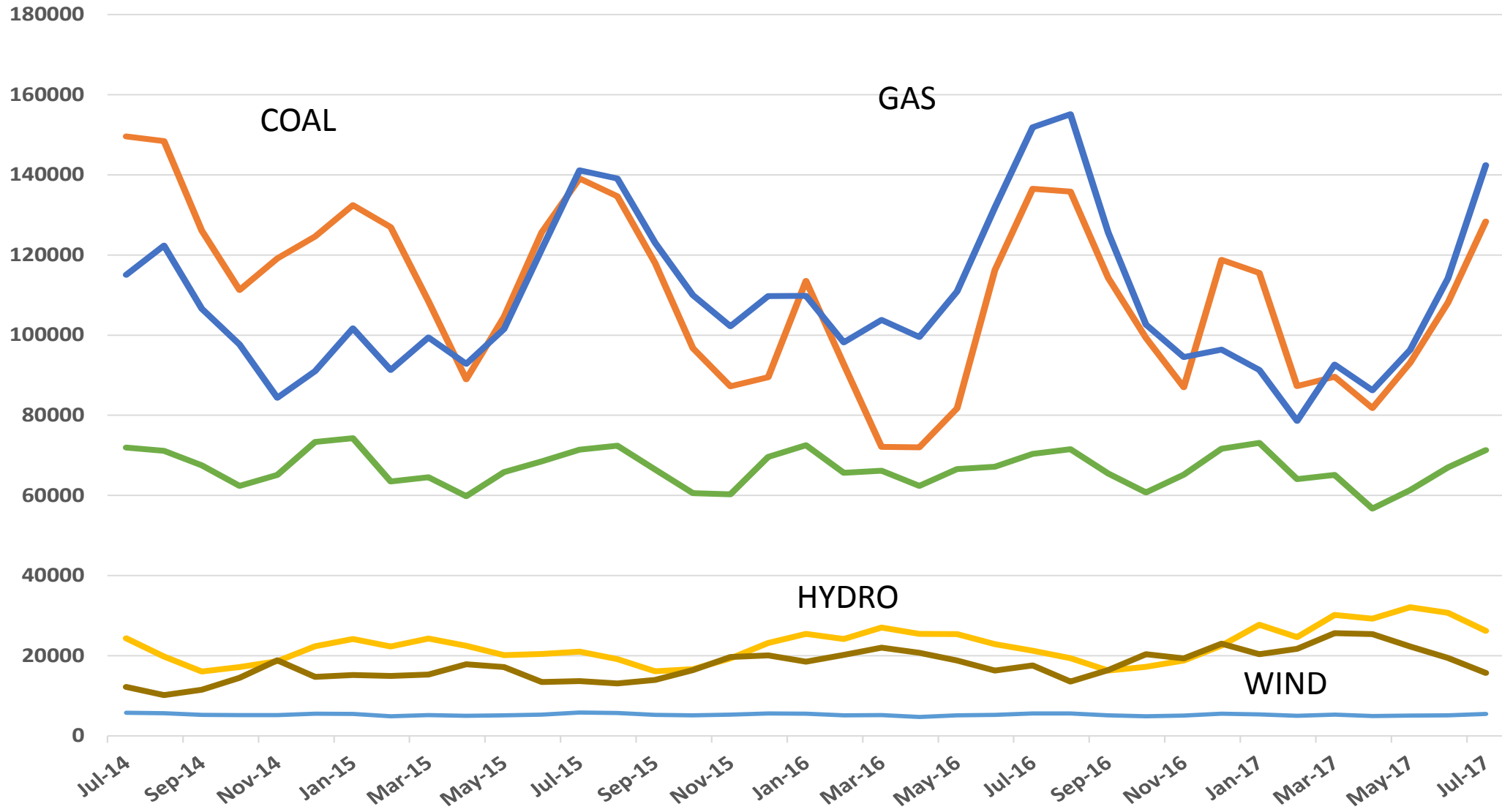
Natural Gas Prices – Henry Hub Vs. Marcellus Area Hubs (nominal \$/MMBtu)

Select Marcellus Area Vs. Henry Hub Gas Prices



Data Source: EIA.

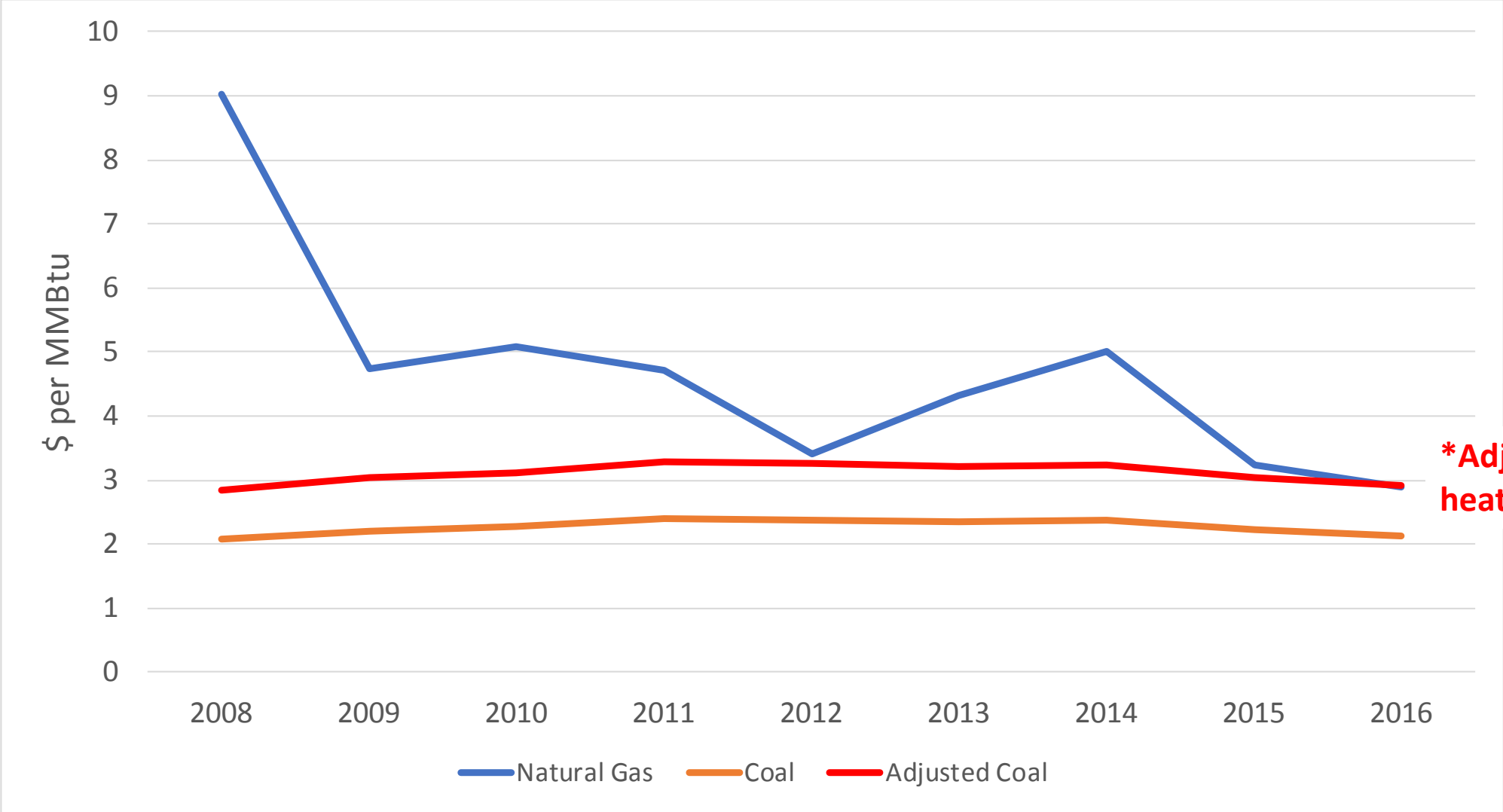
U.S. Net Generation by Resource (GWh)



Data Source: EIA.

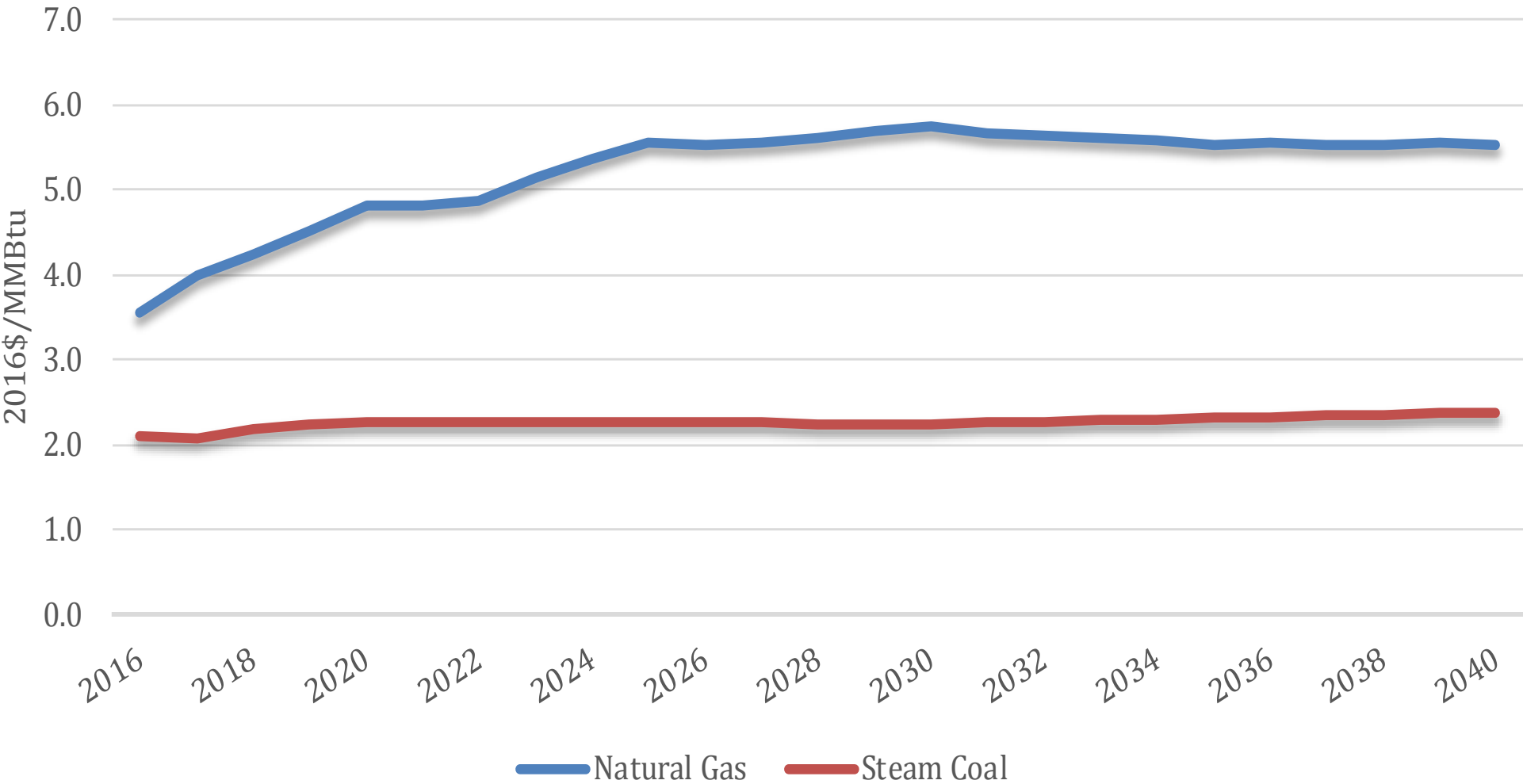
— BIOMASS — COAL — CONVENTIONAL HYDRO — NATURAL GAS — NUCLEAR — WIND

Historical Natural Gas & Coal Prices to Electricity Sector (2016 \$/MMBtu)



Data Source: EIA.

EIA Forecasted Natural Gas & Coal Prices to Electricity Sector (2016\$/MMBtu)



Data Source: EIA.

What is Being Evaluated

- RTOs, like PJM, are increasing penalty for non-performance
- USDOE's August 2017 "baseload" study recommendations:
 - Expedite the study of wholesale market pricing structure
 - Support R&D for grid resilience, i.e. response to disruptive events
 - Study valuation of essential reliability services – new and existing
 - Improve bulk power system resilience – define and prepare
 - Expand electric-gas coordination – pipelines, etc.
- Capacity and energy market pricing reform –
 - Is coal adequately compensated for what provides (on-site fuel storage)?
 - Is marginal cost the best price signal for wholesale markets?
 - Is flexibility valued enough?
- Some States are attempting to subsidize coal

Coal Slurry Impoundment



Gas Fractionation Facility

